

Claims

1. An integrated gas sensor having a semiconductor body on which there is arranged a gas-sensitive resistor film (4) contacted by electrodes (5), at least one field electrode (2; 6) being situated under the resistor film and isolated by an insulator film (3), characterized in that the insulator film (3) has a thickness that is at least approximately less than or equal to approximately 10 times the Debye length L_D corresponding to this insulator film (3)

$$L_D = \sqrt{\frac{\epsilon \epsilon_0 k T}{q^2 N}}$$

where

T is the temperature,

ϵ is the relative permittivity of the material,

ϵ_0 is the absolute permittivity,

k is the Boltzmann constant,

N is the charge-carrier concentration and

q is the elementary charge.

2. Integrated gas sensor according to Claim 1, characterized in that the insulator film (3) has a thickness that is at least approximately less than or equal to approximately 3 times the Debye length L_D corresponding to this insulator film (3).

3. Integrated gas sensor according to Claim 1 or 2, characterized in that the insulator film (3) has a thickness that is at least approximately less than or equal to approximately the Debye length L_D corresponding to this insulator film (3).

4. Integrated gas sensor according to one of Claims 1 to 3 or the preamble of Claim 1, characterized in that a plurality of microstructured field electrodes (6) is provided as field electrode.

5. Integrated gas sensor according to Claim 2, characterized in that each of the microstructured field electrodes (6) is individually drivable.

6. Integrated gas sensor according to one of Claims 1 to 3, characterized in that one or more heater electrodes are integrated into the semiconductor body.

7. Integrated gas sensor according to one of Claims 1 to 4, characterized in that driver electronics for the gas sensor is monolithically integrated into the semiconductor body.

8. Integrated gas sensor according to one of Claim 5, characterized in that the driver electronics is provided for temperature control.

9. Integrated gas sensor according to one of Claims 1 to 5, characterized in that the thickness of the gas-sensitive film (4) is at most approximately 100 times greater than the Debye length of this gas-sensitive film.

10. Integrated gas sensor according to Claim 2, characterized in that the spacing between the microstructured electrodes (6) is to be made of the order of the grain size of the gas-sensitive film (4). Here insert dependent claims from page 7 beginning at line 27.

11. Integrated gas sensor according to one of Claims 1 to 8, characterized in that the insulator film (3) has a high breakdown field strength (Si_3N_4 , Al_2O_3 , SiO_2) and at least to a great extent does not screen electric fields.